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(56) Documents cited
GB 2249923 A GB 2248364 A EP 0478231 A2
EP 0459344 A1 EP 0459065 A1 EP 0378450 A2
EP 0310876 A2 US 5046082 A

(58) Field of search
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(54) **Programming a cellular radio telephone**

(57) Set-up data is programmed into the memory of a cellular telephone 10 by coupling a remote computer 40 to the telephone. Communication 30 can be by cable or the telephone network, and using dual multi-frequency (DTMF) tone dialling signals sent/received via an acoustic coupler 20. The set-up data can go into an EEPROM of the telephone via a DTMF CODEC (14, Fig. 2) and a microprocessor. The telephone number of the remote computer can be stored in the telephone 10 at manufacture. Retailers can share a small number of computers and do not need one each.

Fig. 1.

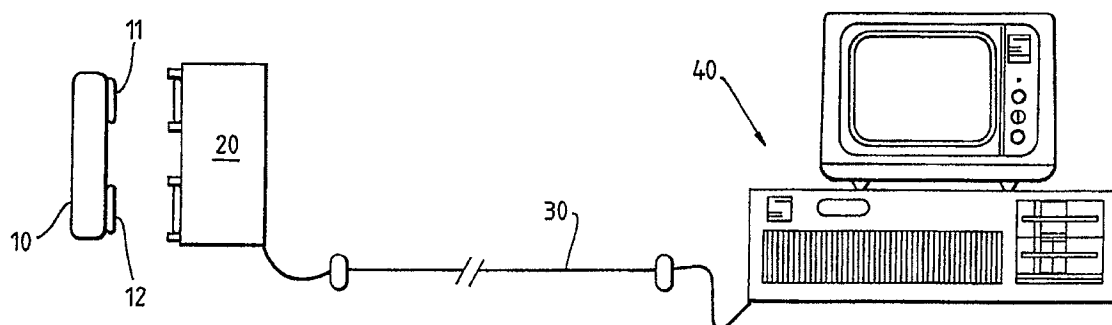
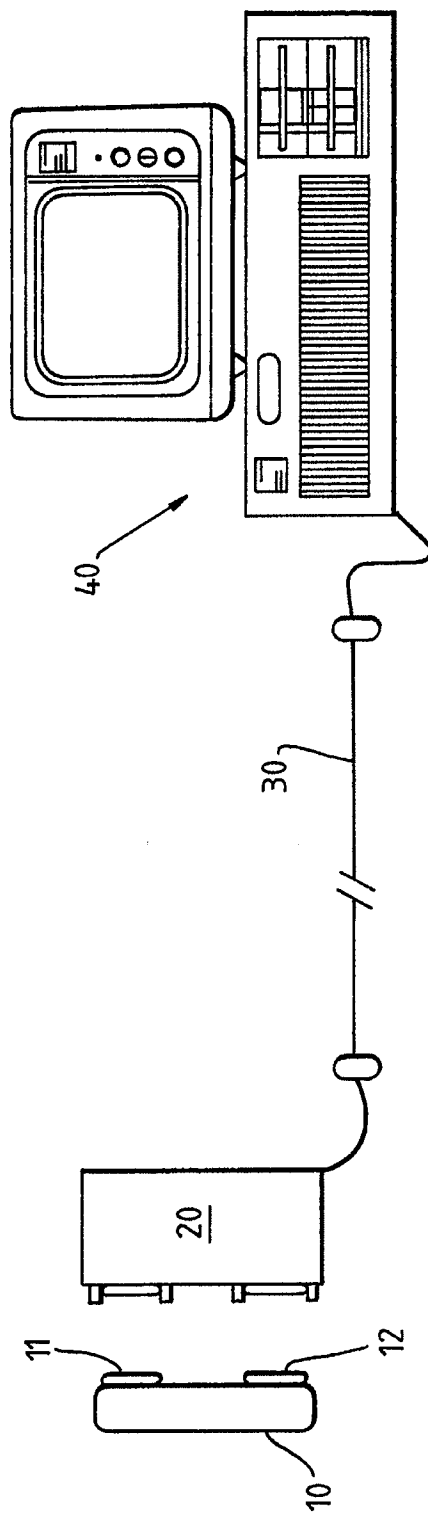


Fig. 1.



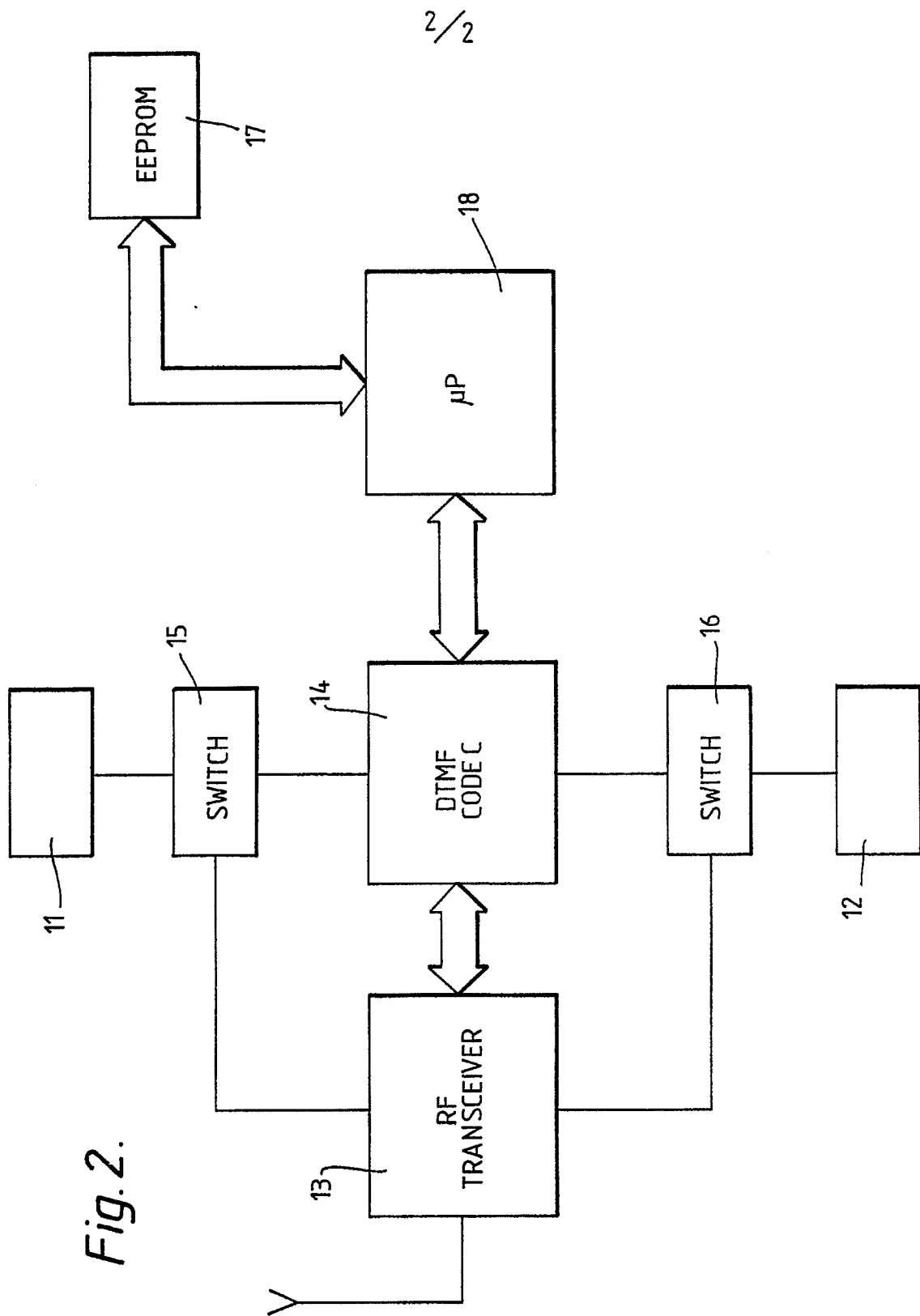


Fig. 2.

Programming of the functions of a cellular radio
telephone

The invention relates to a system and a method for the programming of set-up data into a cellular radio telephone in particular a mobile cellular radio telephone.

Before a cellular radio telephone is first used, the function data, otherwise known as the set-up data or installation data, must first be programmed into the telephone. Such data is, for instance, the subscriber's number, the communication area and/or system within which the mobile telephone will be used, the retailer and/or installer code, the date of installation of the set-up data and any similar data necessary for the use of the mobile telephone.

The set-up data has conventionally been installed in the telephone by the retailer upon delivery. This has usually been done using, for example, a personal computer programmed for this purpose, and through which the set-up data is input into a programmable read-only-memory (PROM), for example, an electronically erasable PROM (EEPROM) in the telephone. This is expensive and complicated, requiring both separate equipment and the ability of the retailer to carry out the task. Additionally after this has been done the cellular telephone network operator must be asked to activate the programmed telephone-in all, a time-consuming operation.

The programming of the telephone may optionally be carried out at the factory. This has the drawback that the retailer has to be able to predict sales in order to have a sufficient number of programmed telephones available. Moreover, the cellular telephone network

operator must be asked to activate a sold telephone. If changes have to be made in the data already programmed at the factory, a separate programming device or service device still must be used at the delivery point so that a retailer can make those changes.

The drawbacks of conventional programming modes are accentuated as the mobile telephones become more generally used and are sold in consumer goods shops instead of specialized shops.

According to the present invention there is provided a system for programming data into a memory of a cellular radio telephone, comprising means for selecting the data to be programmed into the memory, coupling means for coupling the telephone memory to the data selecting means, means operable to transfer the selected data to the memory from the data selecting means via the coupling means, the data selecting means being present at a location remote from the telephone.

According to the present invention there is also provided a method for programming data into a memory of a cellular radio telephone comprising the steps of selecting the data to be stored in the memory using a data selecting means located at a location remote from the telephone, transmitting the data via a coupling means to the telephone, and receiving the data and storing it in the memory.

This has the advantage of providing a cheaper and more efficient way as only a few of the more expensive programming devices are required.

The invention will now be described, by way of example only, with reference to the accompanying drawings of which:

Figure 1, is a simplified representation of the main elements of the system for programming set-up data into a telephone; and

Figure 2 is a schematic diagram of the main features of a telephone used in the system of Figure 1.

The telephone 10 includes a transceiver 13 and all other features conventionally found in a cellular telephone. Since these aspects are not directly relevant to the instant invention no further details will be given here except to say that a microprocessor 18 is employed to all the basic functions of the telephone and to control the keypad and display functions.

The microprocessor 18 is also coupled to a PROM 17 suitably an EEPROM in which the set-up data, software and, for example, a telephone number index for useful numbers are stored. The software needed for the programming of the set-up data is stored here.

The telephone 10 is also provided with an earphone 11 and a microphone 12 for inputting and outputting speech - as is conventional in all telephones. The earphone 11 and microphone 12 are coupled, via switches 15,16, to the radio frequency (RF) transceiver 13 of the telephone 10 for normal operation, or to a dual-tone multi-frequency (DTMF) signal coder/decoder (codec) 14 for use when programming set-up data into the EEPROM 17.

The DTMF codec 14 encodes and decodes the DTMF signals transmitted and received through the microphone 17 and earphone 11 respectively.

A programming device 40 having sound removing properties, for example a computer terminal located at

a central location, is equipped with software for loading the set-up data into the telephone 10 and includes means for receiving and transmitting DTMF data signals which are coupled, via a link 30, to a terminal 20.

The terminal 20 is a known device for converting acoustic signals into a form that can be transferred via the link 30 eg an acoustic coupler.

In the simplest embodiment, an appropriate cable may act as the link 30, however in view of the invention, it is more advantageous to utilize a general network, such as an optional telephone network, a cellular telephone network, or similar as the link 30.

The terminal 20 is located at the place where the set-up data is to be loaded into the telephone eg in a retail outlet. Thus by coupling the telephone 10 to the terminal 20, the telephone 10 can be coupled to the programming device 40 via the link 30, so as to allow transmission of DTMF signals between the telephone 10 and the programming device 40. In this way, only a few of the more expensive programming devices 40 are required, where an expert programmer is available when required for more special programming needs.

The software of the programming device 40 comprises routines which ascertain the type, serial number and other basic data of the mobile telephone 10 and, with the assistance of this basic data selects the appropriate set-up data for the telephone 10 from a stored table. This data is then sent via the link 30 and the terminal 20 to the mobile telephone 10. In the data transfer, a known suitable transfer protocol is used, data being coded for the transfer according to this protocol. The protocol may also include the required password checking routines, which are carried

out before starting the programming of the mobile telephone.

For programming in the start-up data the telephone 10 is "hooked up" to the terminal 20, which is located at the remote location, e.g. at the retail outlet, so that the microphone 12 and the earphone 11 of the telephone 10 are acoustically coupled to the terminal 20. The installer at the remote location then calls the central location where the programming device 40 is located via the link 30, thus forming a communication between the programming device 40 and the mobile telephone 10. The call is made by supplying a signal from the microprocessor 18 which is encoded as a DTMF signal and transmitted by the DTMF codec 14 via one 16 of the switches and the earphone 12 to the terminal 20 and on to the programming device 40 via the link 30.

Once the communication is established, the central programming device 40 first requests the telephone for a telephone code, and on receipt of this code it sends the appropriate set-up data to the telephone 10 for storage in the EEPROM 17. The data is transferred from the programming device 40 as DTMF signals which are received and encoded by the DTMF codec 14 which is then processed by the microprocessor 18 and the set-up data loaded into the EEPROM 17 as discussed above.

When the set-up data has been transferred, the programming device 40 informs the cellular telephone network operator of the new subscriber's number by appropriate means, so that the new telephone 10 can be used in the network.

It will be evident to a person skilled in the art from the foregoing description, that various modifications may be made within the scope of the present invention. For example, the programming device 40 could be

provided with several links 30, thus enabling a simultaneous programming of several telephones.

C It is also possible that the telephone number or similar communication data of the programming device 40 are recorded in the storage of the telephone 10 already at the factory. In this case, the programming of the telephone could be started with a given key stroke sequence using the telephone's keypad, after which a communication with the programming device 40 would be automatically formed from the mobile telephone 10 via the terminal 20.

Claims

1. A system for programming data into a memory of a cellular radio telephone, comprising:

means for selecting the data to be programmed into the memory;

coupling means for coupling the telephone memory to the data selecting means;

means operable to transfer the selected data to the memory from the data selecting means via the coupling means;

the data selecting means being present at a location remote from the telephone.

2. A system according to claim 1 wherein the coupling means comprises a linking means coupled to the data selecting means and to a terminal means, the terminal means being couplable to the telephone such that when the telephone is coupled to the terminal means, the telephone memory is coupled to the data selecting means.

3. A system according to claim 2 wherein the terminal means is an acoustic coupler arranged to receive the microphone and earphone of the telephone so as to couple the telephone to the linking means.

4. A system according to claim 2 or claim 3 wherein the linking means is a telephone network.

5. A system according to claim 2 or claim 3 wherein the linking means is a cable.

6. A system according to any preceding claim wherein the data selecting means includes means for encoding the data as DTMF signals and coupling said signals to the linking means for transmission to the telephone.

7. A system according to claim 6 comprising means for receiving and decoding encoded data signals coupled to the telephone from the data selecting means for storage in the memory.

8. A system according to any preceding claim comprising means for encoding DTMF data signals for coupling from said telephone to said linking means for transmission to the data selecting means.

9. A system according to claim 8 wherein the data selecting means includes means for receiving and decoding DTMF signals coupled to the data selecting means from the telephone.

10. A method for programming data into a memory of a cellular radio telephone comprising the steps of:

selecting the data to be stored in the memory using a data selecting means located at a location remote from the telephone;

transmitting the data via a coupling means to the telephone; and

receiving the data and storing it in the memory.

11. A method according to claim 10 further comprising the steps of:

sending a signal from the telephone via the coupling means to the data selecting means to establish a connection therewith such that the data can be

transmitted from the data selecting means to the telephone.

12. A method according to claim 11 wherein the data is transmitted as a DTMF signal.

13. A method according to claim 12 wherein the coupling means is a telephone network and the connection is established by calling the data selecting means using the telephone.

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

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Relevant Technical fields(i) UK CI (Edition _K) _{H4K} (KYA, KYX)(ii) Int CI (Edition 5) _{H04Q} 7/04**Search Examiner**

G N CHAPMAN

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Date of Search

27 JULY 1992

Documents considered relevant following a search in respect of claims 1 TO 13

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X,E	GB 2249923 A (OKI) note page 1 line 27 to page 3 line 8	1, 10 at least
X,P	GB 2248364 A (TECHNOPHONE) note page 7 line 13 to page 8 line 6, and page 9 lines 29 to 32	1, 10 at least
X,P	EP 0478231 A2 (AT & T) note page 1 lines 28 to 33, and figure 2	1, 10 at least
X,P	EP 0459344 A1 (ALCATEL) note Figure 1	1, 10 at least
X,P	EP 0459065 A1 (ETAT FRANCAIS) note Figure 1	1, 10 at least
X	EP 0378450 A2 (TECHNOPHONE) note column 5 lines 16 to 25, and column 6 lines 44 to 57	1, 10 at least
X	EP 0310876 A2 (MOTOROLA) note column 5 lines 17 to 41	1, 10 at least
X,P	US 5046082 (ZICKER) note column 3 lines 11 to 58	1, 10 at least

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

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